Acquisition

r e f o r m

w e e k III

H e r m e s v s . a t h e n a :
a t o t a l o w n e r s h i p
c o s t
s i m u l a t i o n

Introduction

Acquisition Reform Week III
Total Ownership Cost Simulation

Scope

The Total Ownership Cost (TOC) Simulation guides multifunctional focus groups to apply tradeoffs between performance, schedule and risk to meet requirements using TOC as the controlling factor. Participants evaluate the risk and benefits of particular approaches to controlling TOCs.

This is a role play simulation based on a notional mission area capability provided by two systems: the HERMES Mobile Command Post, an aging war-house with nearly 30 years of service; and, its planned replacement – ATHENA – a new state-of-the-art system based on emerging technology. HERMES has performed well beyond its expected service life but age and obsolescence are taking their toll. Maintenance costs are increasing at a rate which puts HERMES in direct competition for funds required to field ATHENA. New budget guidance has severely impacted the implementation of this program. Participants must select a management strategy that will control the present cost of owning a capability to ensure funds will be available for future upgrades. Participants are required to select one of three alternatives. At the conclusion of the session, a simple simulation based on the roll of the dice is used to demonstrate the probabilities of success and risks of failure inherent to the chosen alternative.

Instructions to Facilitators

The Acquisition Reform Week III Total Ownership Cost Simulation takes approximately two hours to complete. Key facilitator roles include referee and timekeeper. Give the team process a chance to work, but be aware of time constraints. Be ready to help the group past some disagreement and diversions. Information provided is intended to support discussion, but is not necessarily complete in all technical details. Keep the group members focused on the larger picture. Technical items of information that group members feel are missing may be flagged “for further investigation”, or reasonable assumptions may be made about the missing data. As Facilitator, you will need a copy of the full package in the file, as follows:

1. Facilitator Guide……1-5

2. Scenario and Information Packages……...6-23

3. Simulation Instructions and Outcomes……..24-45

Facilitator Guide

Acquisition Reform Week III
Total Ownership Cost Simulation

The following tips will aid you in facilitating the Total Ownership Cost (TOC) Simulation. Remember, let the participants experience forming a Working Group and solving a team problem. Do not over-direct or lead them to a solution, but help them stay focused and keep their decision process moving. The most important aspect is for you to review this material carefully, IN ADVANCE, so you are comfortable in your role.

Before you begin, make sure you have the following:

- Game Board - 1
- Dice (3)
- Pawns (2)
- Markers (5)
- Role Play Scripts (1 complete set for every three participants; print off the CD ROM)
    - User Requirements Representative
    - Acquisition Program Representative
    - Support and Maintenance Representative
- Facilitator Instructions and Simulation Instructions/Outcome Tables for Alternatives ONE, TWO, and THREE - (1 set per facilitator; print off CD ROM)

(It may be helpful to have roles identified as the Working Group begins to interact. Have some tent cards (or 3x5 cards folded in half) and let each participant fill in his or her role.)

1. Bring your group together. Introduce yourself and explain your role as referee and timekeeper. Ask participants to introduce themselves and give a brief description of their job function or area of expertise.

2. Explain that there are three different role play scripts. The first part of the script provides situation information on the program and is the same for all participants. The second part of the script focuses on a specific role. There are three different roles in this game: the User Requirement Representative, the Acquisition Program Representative, and the Support and Maintenance Representative. Each role views the situation from a different perspective. Briefly review the situation and mission area presented at the beginning of the script with participants. Most important, explain that the group must reach a decision on which strategy alternative they will employ. (A decision template is included with this facilitator guide.)

3. This simulation is designed for 6 to 12 participants, and should not be used with a group larger than 15. Divide the group into three subgroups of equal number. (Participants will share roles, creating three subgroups.) Roles may be assigned to participants with experience related to the role, but that is not essential. You may also let participants choose roles with which they are comfortable or you may assign roles by chance, depending on your group.

4. Announce the following time breakdown to the group:
   - Read background and role play script - 10 minutes
   - Form Working Group/discussion of issues - 60 minutes
   - Focus on group consensus and decision - final 20 minutes (if not already resolved)

   A total of $1^{1/2}$ hours is allotted for the first part of the session; the board game and discussion will take approximately 30 minutes.

5. For some groups, it may be helpful to spend some time discussing the Working Group's purpose, set an agenda for the remaining time, and establish a simple charter or rules of order.

6. If 20 minutes goes by without getting into a discussion of the issues, suggest that each subgroup share what they learned with other members of the Working Group. As they begin to realize that they need to understand the big picture, let them take the lead again, sharing information and making decisions as they see fit. As a last resort, use questioning/brainstorming skills to draw out information. Keep the session on track by announcing periodically how much time is left.

7. If a natural group leader has not emerged after 30 minutes, you may suggest that the group nominate a leader or you may select/appoint one. Remind them that their goal is to reach a group consensus on what strategy they will recommend for the C4I mission area. If they are still struggling after an hour, recommend they isolate their team purpose and set a time schedule for reaching a consensus. There are three possible solutions: Alternatives #1 through #3. When the group has made its determination, they will fill in the decision template and give it to the facilitator.

8. For most groups, it will be useful if they organize the available information and key decision factors in a matrix. If the group has not developed a matrix or an effective alternative approach to the evaluation/decision process after 30 to 45 minutes, then it may be helpful for you to suggest this approach. The following format for a matrix is suggested, although you or the participants may adjust as desired to make it more useful for a particular group. The suggested column headings may be replaced, or other columns added if desired. It's important that the group understand and agree on the meaning of the information to be entered in the various columns. Within the matrix, information can be presented in various ways, including rank ordering or assigning relative values, as long as the presentation is useful for the group discussion and evaluation process. The matrix should help the group to realize that

Performance, Schedule and Risk all vary between the three alternatives to meet the POM reduction of $1.0B and the new ten-year TOC target of $9.5B.

C4I Mission Area Strategy Alternatives
Decision Matrix

	RDA Costs	**Support Costs**	**Disposal Costs**	**Schedule (IOC/FOC, Retirement)**	**Operational Risk**	**Acquisition Risk**	**Support Risk**
Alternative **ONE**							
Alternative **TWO**							
Alternative **THREE**							

9. Based on the alternative selected, the facilitator will use the appropriate Simulation Instruction Package to proceed. Please review the instructions carefully. You only need to review a single alternative; instructions for each are very much alike.

10. After completing the game, be prepared to lead a discussion on one (or all) of the following topics:
    - The dynamics of group behavior

    How team interaction impacted a specific decision
    - The benefit of the Working Group process

Acquisition Reform Week III
Total Ownership Cost Simulation

Work Group_____ has selected_____ to restructure the C4I Mission Area programs. Our rationale and key decision factors are as follows:

Working Group's behaviors observed:

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Hermes vs. athena:
Acquisition
Program
representative
role

HERMES versus ATHENA
The Total Ownership Cost Simulation

Funding the Future by Controlling the Cost of Owning the Present

You represent the ATHENA Program Management Office which is working on developing and fielding the new ATHENA Command and Control System which will replace the HERMES Command Post MCP as the key land mobile component of the joint C4I mission area. You have been tasked to serve on a Joint Working Group chartered to look at the C4I strategy in response to new program budget guidance.

There are two key systems currently involved in this mission area: the HERMES Mobile Command Post, an aging war-house with nearly 30 years of service; and, its planned replacement – ATHENA – a new state-of-the-art system based on emerging technology. HERMES has performed well beyond its expected service life but age and obsolescence are taking their toll. Maintenance costs are increasing at a rate which puts HERMES in direct competition for funds required to field ATHENA. With less-than-desirable performance and escalating costs, HERMES no longer meets user requirements.

ATHENA, currently in development, will provide greatly increased capability over the HERMES and will satisfy requirements for the foreseeable future. But, it has experienced schedule slips because incorporating new technologies to meet all user requirements has been more difficult than anticipated.

Modernization to meet user requirements has been severely impacted by new program budget guidelines, making it necessary to take another look at supporting a legacy system versus expanding the RDA effort necessary to field a replacement. No part of any program element is sacrosanct except that the pre-set ten-years total ownership cost target must be adhered to as closely as possible. An excerpt of the Program Decision Memorandum highlighting the Summary of the Decision is as follows:

> **Excerpt:**
> Subject: Land Mobile Capability for Command, Control, Communications, Computer and Intelligence (C4I) Mission Area
>
> 1. Program Title: ATHENA Command and Control System (CCS) for Oand Mobile C4I Capability
>
> 3. *Summary of Decision. Due to the recent budget decision, all acquisition programs are being evaluated for opportunities to reduce costs. The ATHENA program has been identified for a budget reduction in the budget and program years. Program budget will be reduced $1B over the POM (next five program years), and a Ten-Year Total Ownership Cost target of $9.5B is established. This restructuring is intended to bring the C4I mission area program more in line*

> *with the capabilities of available technologies and allow critical funds to be redirected to other high priority requirements.*
>
> *It is understood that ATHENA is expected to provide an increase in operational performance in the C4I mission area, due to incorporation of advanced products and processes associated with the technologies relevant to this program. However, it has become essential to carefully evaluate and prioritize all mission area programs in light of current budget constraints in order to ensure our forces are provided the right mix of capabilities….*
>
> *##*

In addition to the budget directive, there is top-level leadership direction to consider. Top Levels are concerned about the two major challenges facing DoD: modernizing America's forces to meet early 21st century security needs; and, paying for this required modernization within a constrained budget. Meeting these challenges will require full implementation of acquisition reform initiatives, more civil/military integration to take advantage of commercial technology, a shift of DoD resources from support to modernization and combat, a transformation of current DoD logistics elements to achieve faster response at much lower cost, and better training for the DoD acquisition workforce.

At this point, there are three alternatives for restructuring the mission area that your Working Group has been asked to review. Each takes a different approach to balancing system performance, replacement/disposal schedules; modernization/sustainment costs and associated risks to meet requirements within the directed ten-year total ownership cost target. All of the alternatives treat Total Ownership Cost as an independent variable, but programming estimated costs for a ten-year period is risky. You must make sure the key cost driver elements are identified and control techniques are in place to improve your chances of success.

The current base program calls for a total procurement of 2000 ATHENA units as the follow-on replacement system for the HERMES MCP. Approximately 2500 HERMES remain in inventory. ATHENA is scheduled to replace HERMES over the next 10 years. IOC capability is planned for Year 2 with full operating capability by Year 7. HERMES retirement will begin in Year 2, to be completed by Year 6.

> **Alternative ONE**: Reduce ATHENA fielding in early years and stretch FOC to Year 8. Provide a Service Life Extension Program for existing HERMES systems to reduce support costs over the extended period of its deployment.
>
> **Alternative TWO**: Reduce the ATHENA fielding rate and extend deployment to Year 8. Procure an interim commercial system (dubbed NIKE) to replace HERMES on a short term basis to reduce overall support costs.

Alternative THREE: Discontinue ATHENA development and re-prioritize user requirements to accept a system based on available technologies, including components already developed for ATHENA and other commercial and non-developmental items. This system (dubbed ARES) could be fielded and supported with a contractor logistics support package at an affordable cost. This alternative would include interim contractor support of HERMES system and a long term P3I program to achieve remaining ATHENA user requirements.

Initial analysis indicates that each alternative should achieve the POM cost reduction goal and meet the Ten Year Total Ownership Cost target. Each of the three alternatives offers unique risks, benefits, and variations in funding requirements, so that a final selection will require further evaluation. The complexity of the alternatives, time constraints and other considerations make it necessary to limit the options to only the three alternatives as proposed. Elements of the alternatives cannot be altered or exchanged between alternatives.

Your objective

Your objective is to pick the alternative which has the best chance of meeting mission area requirements while remaining as close as possible to the Total Ownership Cost target. The option you choose will be subjected to a ten-year simulation which takes the risks of your alternative into account to measure your probable success.

To help you make the best decision, you have contacted some of the other members of your team back in the ATHENA Program Office and asked for their input. The attached memorandum summarizes their analysis.

Memorandum

From: **Integrated Product Team**
ATHENA Program Office
To: Acquisition Program Representative,
Joint C4I Mission Area Working Group

SUBJECT: Analysis of C4I Mission Area Alternatives

1. Although we remain convinced that the original ATHENA baseline offers the best approach to providing a 21st Century C4I capability, there are reasons to consider pursuing an alternative, budget constraints representing perhaps the most compelling one. Based on our analysis of the alternatives, we strongly recommend Alternative THREE. This summary report supports our recommendation; a detailed report is forthcoming.

2. Athena's original program plan involved extensive use of advanced military-unique technology with the government acting as the system integrator. Given the Secretary of Defense's high emphasis on reform acquisition, this may not have been the best approach. Both Developmental Testing and Advanced Concept Technology Demonstration results confirm that several technologies essential to achieving performance requirements in the ATHENA ORD are not yet mature. A conservative estimate is that the program schedule will be delayed three to five years if existing requirements are not re-prioritized.

3. In light of this technology overreach situation, the IPT finds Alternative THREE is the best approach to providing the greatest possible capability within budget and schedule constraints. Acme AGT, one of the current Athena contractors, had already submitted a white paper to us outlining an approach similar to Alternative THREE, and their experience and capability makes the position very credible.

4. The execution of the alternative involves splitting out the advanced military-unique technologies into a government-managed P3I program. This enables us to adjust the existing contracts more towards a performance-based requirement. For its part, the contractor will be able to undertake full integration responsibility by taking advantage of existing commercial, NDI, and dual-use technologies, and to more-rapidly integrate an acceptable solution. This will permit rapid development of a Hermes replacement, we've dubbed 'ARES' to meet the most critical performance requirements of the Athena ORD. Although not all of the ATHENA requirement would be achieved now, ARES would substantially enhance C4I capabilities within TOC constraints, and provide potential for upgrade when key technologies are more fully developed. Because of the strong market in this industry sector, contractors also offer fleet management at a reduced cost compared to our developing a full organic support structure.

5. Alternative TWO also provides a viable, but less desirable, approach to the C4I mission. This alternative's most attractive feature is the cost savings achievable by

retiring HERMES quickly in favor of a commercial alternative. Market research shows that several possible commercial alternatives exist, developed and used in the logging, fire-fighting, and commercial broadcasting industries. This approach must also include a careful and intensive evaluation of requirements tradeoffs. Although readily available and supportable at a lower cost, none of the commercial alternatives identified are full-tracked vehicles, which could increase operational risk by reducing mobility in some operating conditions,

6. The IPT feels that Alternative ONE would prove ineffective. While investing in HERMES may slightly improve reliability and marginally reduce O&S costs, it significantly increases risk to Athena. Even if readiness and supportability improve, the issue of limited operational capability remains. Our target is to improve real capability to counter emerging threats on the battlefields of the 21st century. Consequently, it would be imprudent to invest in a thirty year old system when better alternatives exist.

7. The Requirements Evaluation Team has also prepared a set of tables which helps compare Cost, Schedule and Risk components of the systems that are part of the C4I Mission Area. These charts show schedule, either as IOC and FOC years for new systems, or as the beginning and completion of disposal for existing systems. Total ten year costs are shown for combined Research, Development and Acquisition (RDA), Support (including O&S, Contractor Logistics Support, and SLEP costs, and Disposal. For our Risk analysis, we were only able to evaluate *Acquisition risk,* which is the risk that the procurement can be accomplished within the indicated cost and schedule. This set of tables is included as Attachment 1.

8. A final report will be available when approved. Please contact us again if further information is required.

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Attachment 1

Schedule, Cost, Performance Summary
C4I Mission Area Systems

Base Program	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES	Yr 2	Yr 6		2425	140		N/A	
ATHENA	Yr 2	Yr 7	6165	782			Mod	
Totals			6165	3207	140			

Alternative ONE	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES With SLEP	Yr 2	Yr 7	621	2202	149		N/A	
ATHENA	Yr 2	Yr 8	6195	691			Mod	
Totals			6816	2893	149			

Alternative TWO	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES	Yr 1	Yr 3		1095	120		N/A	
NIKE (Interim CI)	Yr 1 Yr 5	Yr 4 Yr 7	1	1279			Low	
ATHENA	Yr 2	Yr 8	6189	738			Mod	
Totals			6190	3112	120			

Alternative THREE	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES	Yr 1	Yr 6		1558			N/A	
ARES	Yr 2 Yr 8	Yr 7 Yr 13	5536	1781			Low	
P3I/ATHENA	Yr 8	Yr 13	467	273			Low	
Totals			6003	3612				

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Hermes vs. athena:
Support and
maintenance
representative
role

HERMES versus ATHENA
The Total Ownership Cost Simulation

Funding the Future by Controlling the Cost of Owning the Present

You are currently responsible for supply and support for the HERMES MCP system which will be replaced by the ATHENA Command and Control system as the key land mobile component of the joint C4I mission area. In preparing to support ATHENA, you have been tasked to serve on a Joint Working Group chartered to look at the C4I strategy in response to new program budget guidance.

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To help you make the best decision, you have contacted other members of your team back in the HERMES Support Office and asked for their input. The attached memorandum summarizes their analysis.

Memorandum

From: Support and Maintenance Evaluation Team
Joint C4I Mission Area, OSCS
To: Support Activities Representative,
Joint C4I Mission Area Working Group

SUBJECT: Analysis of C4I Program Alternatives

1. This is a brief evaluation of the base program and alternatives you provided. It is intended to support your discussion until a more in-depth analysis can be completed.

2. One of the key issues for the C4I mission area program is the rising support cost for HERMES. The base plan addressed this issue by retiring HERMES early and replacing it with the new ATHENA system. Of the alternatives offered for evaluation, Alternative ONE offers advantages that make it the best and most supportable choice as it directly addresses the support issues that are the main concern with HERMES. Investing in a limited HERMES Service Life Extension Program (SLEP) provides additional time to overcome ATHENA delays, while directly reducing support costs and improving reliability and maintainability. Without a SLEP program Hermes support costs are projected to grow by 122% to $2956M over the ten year period. Escalating costs of spares are addressed by updating and improving TDPs and converting them to performance specifications where feasible. Significant improvements can be made in Administrative and Production Lead Time (ALT/PLT), where an analysis of support requirements will identify opportunities to bundle spares, use Direct Vendor Delivery, and establish long term relationships with suppliers to improve terms and pricing. These changes will significantly reduce the spares inventory requirement, at great savings. Performance will also improve in those areas where new technologies are introduced, as through a Modernization Through Spares approach.

3. The SLEP could also include infrastructure improvements and updates, with significant implications for the Army support posture overall. For HERMES, there is presently excess capacity at the Levinsburg and Waynesville depots which could be made available for this program. Community response to the expanded employment in this area would be highly favorable, and likely be viewed favorably by Congressional delegations for both districts.

4. An important related support issue is the ongoing development of an advanced reclamation and disposal pilot program at the Thomaston Army depot. When completed, this facility will be capable of safely and efficiently dealing with the disposal of any system or component, including most hazardous materials. Although HERMES does not include as many identified hazardous materials as some systems, it does contain asbestos, some specialty coatings with toxic disposal considerations, and a certain amount of dihydrous oxide. HERMES will certainly provide the first opportunity to handle the large scale disposal of a system by the new disposal line. The

importance of this enterprise to local area employment and the interest of the affected Congressional delegation should not be underestimated.

5. Alternative TWO was determined to be the next best approach. This approach would continue ATHENA development, requiring the planned investment in the ATHENA support infrastructure eliminated in Alternative THREE. This alternative is acceptable *only* if the program includes the acquisition of all provisioning data and drawing packages. If the commercial item remains in the inventory past the initial planned operational phase, it will be necessary to transition to an organic support capability and the support data must be available.

6. Alternative THREE appears to be less feasible, and the IMT still has several reservations about the contractor logistics support alternative. This alternative would eliminate the HERMES support infrastructure. A contractor team, Holdemup, Inc., and Crusher, Ltd., with experience in supporting and disposing of other military systems, has presented a proposal which outlines an interim support plan for HERMES. The plan is intended to replace the support infrastructure until the ARES system is on line. One of its key elements is the transfer of excess HERMES assets to contractor control for disposal, and the recovery of the intrinsic value of those assets to subsidize the support of remaining HERMES systems. Significant savings could be realized from this support approach, although there might be some political repercussions in light of the Thomaston Disposal Facility project. A thorough A76 Commercial Activities analysis should be carried out to demonstrate that using a contractor to replace a government capability is really the most cost effective way to meet the need.

7. The Requirements Evaluation Team has also prepared a set of tables which helps compare Cost, Schedule and Risk components of the systems that are part of the C4I Mission Area. These charts show schedule, either as IOC and FOC years for new systems, or as the beginning and completion of disposal for existing systems. Total ten year costs are shown for combined Research, Development and Acquisition (RDA), Support (including O&S, Contractor Logistics Support, and SLEP costs, and Disposal. For our Risk analysis, we were only able to evaluate *Support risk*, which is the assessment of system supportability under Athena's O&O. This set of tables is included as Attachment 1.

8. A final report will be available when approved.

VR//s//

Attachment 1

Schedule, Cost, Performance Summary
C4I Mission Area Systems

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ATHENA	Yr 2	Yr 7	6165	782				Low
Totals			6165	3207	140			

Alternative ONE	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES With SLEP	Yr 2	Yr 7	621	2202	149			Low
ATHENA	Yr 2	Yr 8	6195	691				Low
Totals			6816	2893	149			

Alternative TWO	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES	Yr 1	Yr 3		1095	120			High
NIKE (Interim CI)	Yr 1 Yr 5	Yr 4 Yr 7	1	1279				Mod
ATHENA	Yr 2	Yr 8	6189	738				Low
Totals			6190	3112	120			

Alternative THREE	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
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ARES	Yr 2 Yr 8	Yr 7 Yr 13	5536	1781				Mod
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Hermes vs. athena:
user requirements
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There are two key systems currently involved in this mission area: the HERMES Mobile Command Post, an aging war-house with nearly 30 years of service; and, its planned replacement – ATHENA – a new state-of-the-art system based on emerging technology. HERMES has performed well beyond its expected service life but age and obsolescence are taking their toll. Maintenance costs are increasing at a rate which puts HERMES in direct competition for funds required to field ATHENA. With less-than-desirable performance and escalating costs, HERMES no longer meets user requirements.

ATHENA, currently in development, will provide greatly increased capability over the HERMES and will satisfy requirements for the foreseeable future. But, it has experienced schedule slips because incorporating new technologies to meet all user requirements has been more difficult than anticipated.

Modernization to meet user requirements has been severely impacted by new program budget guidelines, making it necessary to take another look at supporting a legacy system versus expanding the RDA effort necessary to field a replacement. No part of any program element is sacrosanct except that the pre-set ten-years total ownership cost target must be adhered to as closely as possible. An excerpt of the Program Decision Memorandum highlighting the Summary of the Decision is as follows:

> **Excerpt:**
> Subject: Land Mobile Capability for Command, Control, Communications, Computer and Intelligence (C4I) Mission Area
>
> 1. Program Title: ATHENA Command and Control System (CCS) for Oand Mobile C4I Capability
>
> 3. *Summary of Decision. Due to the recent budget decision, all acquisition programs are being evaluated for opportunities to reduce costs. The ATHENA program has been identified for a budget reduction in the budget and program years. Program budget will be reduced $1B over the POM (next five program years), and a Ten-Year Total Ownership Cost target of $9.5B is established. This restructuring is intended to bring the C4I mission area program more in line*

> *with the capabilities of available technologies and allow critical funds to be redirected to other high priority requirements.*
>
> *It is understood that ATHENA is expected to provide an increase in operational performance in the C4I mission area, due to incorporation of advanced products and processes associated with the technologies relevant to this program. However, it has become essential to carefully evaluate and prioritize all mission area programs in light of current budget constraints in order to ensure our forces are provided the right mix of capabilities….*
>
> *##*

In addition to the budget directive, there is top-level leadership direction to consider. Top Levels are concerned about the two major challenges facing DoD: modernizing America's forces to meet early 21st century security needs; and, paying for this required modernization within a constrained budget. Meeting these challenges will require full implementation of acquisition reform initiatives, more civil/military integration to take advantage of commercial technology, a shift of DoD resources from support to modernization and combat, a transformation of current DoD logistics elements to achieve faster response at much lower cost, and better training for the DoD acquisition workforce.

At this point, there are three alternatives for restructuring the mission area that your Working Group has been asked to review. Each takes a different approach to balancing system performance, replacement/disposal schedules; modernization/sustainment costs and associated risks to meet requirements within the directed ten-year total ownership cost target. All of the alternatives treat Total Ownership Cost as an independent variable, but programming estimated costs for a ten-year period is risky. You must make sure the key cost driver elements are identified and control techniques are in place to improve your chances of success.

The current base program calls for a total procurement of 2000 ATHENA units as the follow-on replacement system for the HERMES MCP. Approximately 2500 HERMES remain in inventory. ATHENA is scheduled to replace HERMES over the next 10 years. IOC capability is planned for Year 2 with full operating capability by Year 7. HERMES retirement will begin in Year 2, to be completed by Year 6.

> **Alternative ONE**: Reduce ATHENA fielding in early years and stretch FOC to Year 8. Provide a Service Life Extension Program for existing HERMES systems to reduce support costs over the extended period of its deployment.
>
> **Alternative TWO**: Reduce the ATHENA fielding rate and extend deployment to Year 8. Procure an interim commercial system (dubbed NIKE) to replace HERMES on a short term basis to reduce overall support costs.

Alternative THREE: Discontinue ATHENA development and re-prioritize user requirements to accept a system based on available technologies, including components already developed for ATHENA and other commercial and non-developmental items. This system (dubbed ARES) could be fielded and supported with a contractor logistics support package at an affordable cost. This alternative would include interim contractor support of HERMES system and a long term P3I program to achieve remaining ATHENA user requirements.

Initial analysis indicates that each alternative should achieve the POM cost reduction goal and meet the Ten Year Total Ownership Cost target. Each of the three alternatives offers unique risks, benefits, and variations in funding requirements, so that a final selection will require further evaluation. The complexity of the alternatives, time constraints and other considerations make it necessary to limit the options to only the three alternatives as proposed. Elements of the alternatives cannot be altered or exchanged between alternatives.

Your objective

Your objective is to pick the alternative which has the best chance of meeting mission area requirements while remaining as close as possible to the Total Ownership Cost target. The option you choose will be subjected to a ten-year simulation which takes the risks of your alternative into account to measure your probable success.

To help you make the best decision, you have contacted some of the analysts back at the Joint Operational Requirements and asked for their input. The attached memorandum summarizes their analysis.

Memorandum

From: **C4I Mission-Area Requirements Evaluation Team**
Joint Operations Requirements Committee
To: Requirements Representative, Joint C4I Mission Area Working Group

Subj: Analysis of C4I Program Alternatives

1. The following summary captures the key points and issues identified in our discussion of the three alternatives presented. A detailed analysis will follow.

2. Given the OSD high emphasis on achieving a near term integrated, secure, and "smart" Command, Control, Communications, and Intelligence (C4I) infrastructure, this program should be based on cutting edge technology to the maximum extent possible.

3. Among the alternatives presented, the Evaluation Team feels Alternative TWO is the most effective and cost efficient approach, with the clear caveat that any commercial item acquired under this plan would be only an interim system. This alternative trades off requirements in the short term, so that commercial items, with minor modifications if needed, may be used to provide the essential elements of C4I capability. Development of ATHENA is continued and HERMES is phased out on a schedule close to that of the base program, with significant O&S savings. New commercial items should attain the required readiness levels of which HERMES is no longer capable. A minor disadvantage of this approach would be that commercial systems may offer some reduced operational capabilities in certain mission areas, such as survivability and mobility. This should be acceptable in the short term, until ATHENA development is completed and fielding begun.

4. As a back-up position, Alternative ONE can be considered marginally acceptable. A properly focused Service Life Extension Program (SLEP) could substantially improve the readiness of HERMES at a relatively low cost. This measure would not address the improvement in operational capability, particularly with regard to the new communications technology and development which will be incorporated into ATHENA. However, by alleviating critical short term readiness and performance issues, a SLEP program would achieve the crucial goal of permitting continued development and eventual fielding of ATHENA CCS.

5. Alternative THREE is considered the least desirable solution. This approach does reduce operational and schedule risk through the use of existing technology, but it would, in all likelihood, trade off too many critical performance requirements and provide a system incapable of supporting the Revolution in Military Affairs. Although it provides a P3I program component to be supported by continuing technology base developments, this would not begin to field units meeting all ATHENA ORD requirements until Year 8.

6. The C4I Mission-Area Requirements Evaluation Team analyzed the base program and the restructured alternatives to determine what level of performance could be expected from each system in comparison to the threshold (required) and objective (desired) requirements in the ATHENA ORD. The results are summarized in Table 1. [Note: The line labeled **Technology Tracking Items** summarizes how well each system in the mission area incorporates emerging technologies which are essential to meeting some of the ATHENA ORD requirements. These emerging technology items range from anti-jam radio transmission rates and microprocessor capabilities to miniaturized satellite antennas, new advanced software, light weight ballistic materials, application of stealth techniques, mobility enhancements and provisions for orders of magnitude increases in reliability.]

Table 1
C4I System Performance Evaluation

		HERMES	HERMES with SLEP	NIKE (Interim CI)	ARES	P3I
Technology Tracking Items	**T**	**0**	**0**	**50**	**50**	**100**
	O	**0**	**0**	**25**	**25**	**100**
C4I Capability	**T**	**50**	**50**	**75**	**85**	**100**
	O	**15**	**15**	**50**	**50**	**100**
Survivability	**T**	**50**	**50**	**35**	**75**	**100**
	O	**25**	**25**	**15**	**50**	**100**
Mobility	**T**	**50**	**50**	**45**	**90**	**100**
	O	**25**	**25**	**25**	**90**	**100**
Readiness & Support	**T**	**25**	**50**	**85**	**90**	**100**
	O	**10**	**25**	**50**	**75**	**100**

Table Legend
T: Threshold (minimum) requirement defined in ATHENA Operational Requirements Document
O: Objective (desired) requirement defined in ATHENA Operational Requirements Document

7. The Requirements Evaluation Team has also prepared a set of tables which helps compare Cost, Schedule and Risk components of the systems that are part of the C4I Mission Area. These charts show schedule, either as IOC and FOC years for new systems, or as the beginning and completion of disposal for existing systems. Total ten year costs are shown for combined Research, Development and Acquisition (RDA), Support (including O&S, Contractor Logistics Support, and SLEP costs, and Disposal. For our Risk analysis, we were only able to evaluate *Operational risk*, which is the assessment of risk to accomplish system performance measured against Athena's operation and organization (O&O) plan. This set of tables is included as Attachment 1.

8. A final report will be available when approved.

VR//s//

Attachment 1

Schedule, Cost, Performance Summary
C4I Mission Area Systems

Base Program	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES	Yr 2	Yr 6		2425	140	High		
ATHENA	Yr 2	Yr 7	6165	782		Low		
Totals			6165	3207	140			

Alternative ONE	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES With SLEP	Yr 2	Yr 7	621	2202	149	High		
ATHENA	Yr 2	Yr 8	6195	691		Low		
Totals			6816	2893	149			

Alternative TWO	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES	Yr 1	Yr 3		1095	120	High		
NIKE (Interim CI)	Yr 1 Yr 5	Yr 4 Yr 7	1	1279		High		
ATHENA	Yr 2	Yr 8	6189	738		Low		
Totals			6190	3112	120			

Alternative THREE	Schedule IOC to FOC or Start/end Disposal		Ten Year Total Ownership Costs($M)			Risk		
	Start	End	RDA	Support	Disposal	Operational	Acquisition	Support
HERMES	Yr 1	Yr 6		1558		High		
ARES	Yr 2 Yr 8	Yr 7 Yr 13	5536	1781		Mod		
P3I/ATHENA	Yr 8	Yr 13	467	273		Low		
Totals			6003	3612				

Acquisition

reform

week III

Hermes vs. athena:
alternative
1

Facilitator Guide
for
Total Ownership Cost Simulation

Phase IV
The Boardgame

Alternative ONE

I. Setting up the Boardgame.

For this phase, in addition to this guide, you will need the following:

Total Ownership Cost Simulation Game Board
Three Dice
Five Tokens for tracking budget scales
Two Pawns
Outcome Tables for Alternative ONE

1. Read to the team the following introduction:

Alternative ONE

> "You selected Alternative One. This decision is to establish a limited service life extension program (SLEP) to improve HERMES supportability and reliability and reduce Total Ownership Cost of HERMES while continuing development and fielding of ATHENA."
>
> "This simulation will test your strategy against a combination of predetermined and random events. Remember, your goal is to provide a C4I capability which meets the user need for an affordable life cycle cost. Cost, performance and schedule will be concerns throughout the program life, and your effectiveness will be evaluated on the basis of achieving target goals in each area. Your goal will be to provide a fully modernized capability - 2000 ATHENA systems in the field - without exceeding the ten year Total Ownership Cost target. Reducing TOC below the target will undoubtedly be rewarded, but exceeding the target or failing to procure the required number of systems could adversely impact your career."

2. Place the Gameboard on the table and arrange the game pieces as follows:

   a) Put a marker on each budget scale as follows (top edge of the token should touch the value indicated):
      RDA $6.25B
      O&S $2.75B

SLEP $600M
Disposal $150M
CLS No marker

b) Place one pawn on the "Start" space on the Event/Year track (hourglasses) on the left side of the board.
c) Place one pawn on the "Start" space on the Systems Procured track (coins) in the center of the board.
d) Give the Team Leader the dice.
e) Use the Gameboard Results template to record the result of each roll and final positions.

II. Playing the Boardgame

1. Events cover two years, so move the Event/Year pawn to Year 2, roll the dice and read the results of that roll from the Outcome Table for Alternative ONE, Event 1. Move markers on the budget scales to reflect the indicated expenditures and move the Systems Procured pawn the number of new systems procured. Record the results on the Gameboard Results template.

2. Move the Event/Year marker to Year 4, and repeat Step 1, using the Outcome Table for Alternative ONE, Event 2.

3. Continue as above for Year 6 (Event 3), Year 8 (Event 4) and Year 10 (Events 5), using the appropriate outcome tables.

4. Play is complete when outcomes have been determined for all five events. If 2000 new systems are procured before event 5, continue to play but retain RDA funds as excess instead of buying more systems.

5. If one of the budget lines is depleted before all events have been played out, funding may be "reprogrammed" by placing the marker for the depleted fund line on top of another marker. The "stacked" markers are then moved twice per event - once for each funding type. Reprogramming is only possible between RDA, O&S, and CLS. (Reprogramming is not required, and players may elect to continue deficit spending.)

6. Record the results of the game on the Gameboard Results template. Discuss the strategy choice and simulation outcome. Key points for discussion include why the alternative was selected and what risk factors were identified as part of the decision process.

Event 1: Years 1 - 2

Variable	ROLL 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 -18
Scenario	SLEP program has gone well for the past two years. SLEP costs have been right on projections and the delivery schedule has been met as planned. O&S costs for HERMES have risen as predicted, but the rise is expected to be offset by the improved reliability of the SLEP units. Initial reports about the first units fielded are very encouraging. R&D for ATHENA continues at a very low level, and some of the technical issues have been successfully resolved. Costs for this period are:	The User community declines to relax any of the ATHENA ORD requirements. R&D costs for ATHENA go up. Negotiations for SLEP did not go smoothly, and the resultant delay in beginning SLEP kept O&S costs higher than projected. Costs for this period are:	SLEP program began as scheduled, but quickly ran into technical problems and costs began to rise. SLEP production schedule was met, but O&S savings were not as good as anticipated. Costs for this period are:	Contract negotiations didn't go as planned and SLEP price increased. Additionally, technical problems due to the age of the systems delayed production and increased SLEP cost further. Resultant fielding delay allowed O&S costs to remain well above the projected SLEP savings target. Total costs for this period are:
RDA ATHENA	500M	500M	750M	750M
O&S ATHENA	1000M	1500M	1750M	1750M
SLEP HERMES	300M	300M	300M	300M
DISPOSAL HERMES	25M	25M	25M	25M
FIELDING SCHEDULE ATHENA	100 units fielded	100 units fielded	No units fielded yet	No units fielded yet

Event 2: Years 3 - 4

Variable	ROLL 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 -18
Scenario	The improved reliability of SLEP systems in the field has been outstanding. Decision was made to end SLEP program after three years and 1500 systems in view of this success. HERMES O&S cost growth has been maintained at planned levels. ATHENA RD effort has also gone well and LRIP should start as planned next year. Costs for this period are:.	SLEP program costs remained with projections, and the program was ended after Yr 2. However, the anticipated O&S savings were never fully realized. Negotiations for further SLEP indicated a steep price increase for a follow-on effort. ATHENA R&D costs have been above budget due to technology over-reach issues which are becoming critical in view of next year's scheduled LRIP start. Costs for this period are:	Due to the serious problems with obsolete parts, SLEP costs were significantly higher than budgeted. Furthermore, the SLEP effort seemed to have little effect and O&S costs have continued to rise as the Army struggles with reliability and readiness issues for the HERMES fleet. It is hoped that ATHENA will help, and LRIP should begin on schedule next year, although R&D costs are edging up. Costs for this period are:	SLEP program cost overruns have only gotten worse over time. At the same time, performance of SLEP units has been far below expectations and O&S costs are higher than ever. Contract negotiations for additional units were successful, but the price went up slightly and system performance didn't improve. ATHENA R&D cost is up, and there are serious concerns about readiness for LRIP next year. Total costs for this period are:
RDA ATHENA	1750M	1750M	1750M	2000M
O&S ATHENA and HERMES	750M	1000M	1000M	1250M
SLEP HERMES	300M	300M	300M	450M
DISPOSAL HERMES	50M	50M	50M	75M
FIELDING SCHEDULE ATHENA	500 units fielded	400 units fielded	300 units fielded	300 units fielded

Event 3: Years 5 - 6

Variable	ROLL 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 -18
Scenario	The SLEP program continues to exceed expectations. O&S costs are meeting reduction goals, and system performance and reliability are meeting requirements. ATHENA LRIP began on schedule, with technological issues resolved. OT was successful and introduction of the system into the fleet began this year. Disposal costs for HERMES are steady at budgeted levels. Costs for this period are:	O&S costs have continued to rise faster than projected, although the SLEP program has had some effect. ATHENA LRIP began on schedule and the requirements tradeoffs allowed the contractor to maintain schedule despite some technological problems. R&D costs exceeded budget, but the technology tradeoffs kept the system unit price at the target level. Transition to full rate production and fleet introduction have met schedule. Costs for this period are:	With O&S costs for HERMES continuing to rise despite the SLEP effort, there was much optimism about the ATHENA production start last year. However, OT problems drove up the RDA and delayed the fielding schedule. Less than half the units scheduled made it to the field. Costs for this period are:	HERMES O&S have continued to rise steadily. Some relief was gained when HERMES retirement began as ATHENA production got started last year. However, this was offset by new EPA regulations regarding some of the vehicle coatings, resulting in new costs. Additionally, ATHENA production costs exceeded projections due to problems with processes required for some of the new low IR reflectance materials. On the bright side, production totals meet goals for the fielding schedule. Total costs for this period are:
RDA ATHENA	2500M	2500M	2500M	2500M
O&S ATHENA and HERMES	500M	500M	750M	750M
SLEP HERMES	0M	0M	150M	150M
DISPOSAL HERMES	50M	50M	75M	75M
FIELDING SCHEDULE ATHENA	900	800	700	500

Event 4: Years 7- 8

Variable	ROLL 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 -18
Scenario	ATHENA production proceeds on schedule and on budget. HERMES retirement is also proceeding as scheduled, so that only SLEP HERMES remain in service last year when a major conflict in Central Europe required deployment of a large part of the US Forces C4I capability. Performance of ATHENA and HERMES was outstanding. Even with the deployment stress, O&S costs remained at budgeted levels and reliability and readiness met all goals. After only a short delay, retirement of CONUS based HERMES was continued as planned. Costs for this period are:	ATHENA production remains on schedule, but O&S costs for ATHENA have exceeded projections. O&S cost increases were exacerbated by the force buildup in the Middle East in response to continued defiance of UN weapons inspection teams. The total deployment requirement placed heavy stress on both ATHENA and HERMES systems, revealing unanticipated problem areas with ATHENA and highlighting some of the obsolescence problems that HERMES has long struggled with. Operational performance was acceptable, but reliability and readiness were not. Contractor made heroic efforts to support production and fielded units, but was unable to meet fielding schedule. Costs for this period are:	The Army's C4I capability was stressed significantly when a build up in the middle East was required at the same time tensions, and operational requirements were heightened in Central Europe. ATHENA performed well, but it was necessary to provide support with components from the assembly line, delaying production and fielding of additional units. The resultant additional tasking for HERMES pushed O&S costs even higher. Costs for this period are:	As more ATHENA systems entered the field, more support problems have been identified and O&S costs continue to exceed projections. Some relief was hoped for when HERMES retirement began as ATHENA production got started last year. However, this was offset by new EPA regulations regarding some of the vehicle coatings, resulting in increased disposal costs. Additionally, ATHENA production costs exceeded projections due to problems with production of the new low IR reflectance materials. On the bright side, production totals meet goals for the fielding schedule. Total costs for this period are:
RDA	1500M	1750M	2000M	2250M

ATHENA				
O&S ATHENA and HERMES	250M	250M	500M	750M
SLEP HERMES	0M	0M	0M	0M
DISPOSAL HERMES	25M	50M	75M	50M
FIELDING SCHEDULE ATHENA	500	400	400	300

Event 5: Years 9 - 10

Variable	ROLL 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 -18
Scenario	ATHENA production is on time and on budget. HERMES is completely retired, and users are very happy with the new system. O&S costs have stayed on the budget target and performance has exceed expectations. The final retirement of the HERMES systems was completed without incident and without unexpected costs. Costs for this period are:	ATHENA production costs exceeded projections. Additionally, O&S costs continue higher than expected by about 10%. PMO is conducting an evaluation of possible fixes. HERMES retirement was completed without further incident, although the EPA did manage one final levy that resulted in a small cost increase. Costs for this period are:	ATHENA production is behind schedule and significantly over budget. Fielded systems have been demonstrating great operational capability but disappointing readiness rates. The result is a significant increase in O&S costs over budget projections. Happily, HERMES was retired without further cost increases. Costs for this period are:	ATHENA production over budget and behind schedule. O&S costs for ATHENA continue to exceed projections, and, as a final blow, disposal costs for the last HERMES systems was almost doubled due to contractor default and negotiation of a new contract combined with new EPA regulations. Total costs for this period are:
RDA ATHENA	0M	250M	250M	250M
O&S ATHENA and HERMES	250M	250M	250M	500M
SLEP HERMES	0M	0M	0M	0M
DISPOSAL HERMES	0M	25M	25M	25M
FIELDING SCHEDULE ATHENA	0	100	100	100

Acquisition

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Her mes vs.athena:
al t er n at ive
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Facilitator Guide
for
Total Ownership Cost Simulation

Phase IV
The Boardgame

Alternative TWO

I. Setting up the Boardgame.

For this phase, in addition to this guide, you will need the following:

Total Ownership Cost Simulation Game Board
Three Dice
Five Tokens for tracking budget scales
Two Pawns
Outcome Tables for Alternative TWO

1. Read to the team the following introduction:

Alternative TWO

> "You selected Alternative TWO. This approach is based on using a Commercial Item to provide an interim C4I capability while continuing development of ATHENA. HERMES will be retired as soon as possible to address the problem of rapidly increasing O&S costs for this aging system."
>
> "This simulation will test your strategy against a combination of predetermined and random events. Remember, your goal is to provide a C4I capability which meets the user need for an affordable life cycle cost. Cost, performance and schedule will be concerns throughout the program life, and your effectiveness will be evaluated on the basis of achieving target goals in each area. Your goal will be to provide a fully modernized capability - 2000 ATHENA systems in the field - without exceeding the ten year Total Ownership Cost target. Reducing TOC below the target will undoubtedly be rewarded, but exceeding the target or failing to procure the required number of systems could adversely impact your career."

2. Place the Gameboard on the table and arrange the game pieces as follows:

   a) Place a marker on each budget scale as follows (top edge of the token should touch the value indicated):
      RDA $6.25B

O&S $2.0B
SLEP No marker
Disposal $125M
CLS $1.25B

b) Place one pawn on the “Start” space on the Event/Year track (hourglasses) on the left side of the board.
c) Place one pawn on the “Start” space on the Systems Procured track (coins) in the center of the board.
d) Give the Team Leader the dice.
e) Use the Gameboard Results template to record the result of each roll and final positions.

II. Playing the Boardgame

1. Events cover two years, so move the Event/Year pawn to Year 2, roll the dice and read the results of that roll from the Outcome Table for Alternative TWO, Event 1. Move markers on the budget scales to reflect the indicated expenditures and move the Systems Procured pawn the number of new systems procured. Record the results on the Gameboard Results template.

2. Move the Event/Year marker to Year 4, and repeat Step 1, using the Outcome Table for Alternative TWO, Event 2.

3. Continue as above for Year 6 (Event 3), Year 8 (Event 4) and Year 10 (Events 5), using the appropriate outcome tables.

4. Play is complete when outcomes have been determined for all five events. If 2000 new systems are procured before event 5, continue to play but retain RDA funds as excess instead of buying more systems.

5. If one of the budget lines is depleted before all events have been played out, funding may be “reprogrammed” by placing the marker for the depleted fund line on top of another marker. The “stacked” markers are then moved twice per event - once for each funding type. Reprogramming is only possible between RDA, O&S, and CLS. (Reprogramming is not required, and players may elect to continue deficit spending.)

6. Record the results of the game on the Gameboard Results template. Discuss the strategy choice and simulation outcome. Key points for discussion include why the alternative was selected and what risk factors were identified as part of the decision process.

Event turn 1; Year 1 -2

Variable	Roll 3 - 7	ROLL 8 - 10	Roll 11 -13	Roll 14 - 18
Scenario	Through hard work and tough negotiations, the user requirements are prioritized for an interim NIKE based on CAIV tradeoffs. A NIKE is quickly selected based on filling most key user requirements and deliveries are ahead of schedule. As a result, Hermes retirements are also ahead of schedule.	Through hard work and tough negotiation, the user requirements for an interim NIKE are prioritized and the plan quickly approved. An acceptable NIKE was selected based on filling most key user requirements and deliveries have begun. The first 500 Hermes are retired on schedule.	Through hard work and tough negotiation, user requirements are re-prioritized for an interim NIKE based on CAIV tradeoffs. There is initially some opposition to the plan, and obtaining needed approval takes time. This delays finding an acceptable NIKE. Finally a commercial source is selected and deliveries begun. The delay impacts Hermes' retirement schedule as well, costing additional O&S funds.	Despite hard work and tough negotiation, re-prioritizing the Athena requirements for an interim NIKE proves difficult. Once final agreement is reached by the working group, reviewers over-ride several decisions. This delays finding an acceptable NIKE. A consensus is finally reached, a commercial source selected and deliveries begun almost a full year later than planned. The delay prevents retiring Hermes as well, costing additional O&S funds.
RDA ATHENA and NIKE	500M	500M	750M	750M
O&S ATHENA and HERMES	1000M	1000M	1250M	1500M
DISPOSAL HERMES	25M	50M	50M	75M
CLS NIKE	500M	500M	750M	750M
Fielding Schedule ATHENA	100	100	100	0

Event turn 2; Year 3 - 4

Variable	Roll 3 - 7	ROLL 8 - 10	Roll 11 -13	Roll 14 - 18
Scenario	Fielding of the NIKE continues according to schedule. Feedback from the field is positive; the NIKE is viewed as a big improvement over Hermes. Rolling the O&S savings back into Athena allowed that program to recover almost a full year of time, so production and fielding has already begun, slightly ahead of schedule. This permits Hermes retirement to be accelerated, saving additional O&S funds.	Fielding of the NIKE continues according to schedule. Feedback from the field is generally positive, with minor improvements made by the contractor based on field input. After some initial OT issues were resolved, Athena full production and fielding has begun. Hermes retirement is on schedule.	Feedback from the field concerning the NIKE's performance is generally positive, but does indicate some unforeseen minor changes are needed, delaying further fielding for several weeks. Some initial OT issues with Athena result from unresolved technology overreach issues, but are eventually resolved. Athena full production and fielding begins.	Feedback from the field concerning the NIKE's performance indicates unforeseen performance shortfalls and changes to the item are needed, delaying continued fielding. Athena's requirements overreach issue continues to haunt the program, lengthening the RD phase and delaying initial production and fielding. O&S costs for Hermes continue to skyrocket, and the NIKE and Athena delays mean many Hermes remain in 'the system.' To top it all off, changes to environmental laws cause a significant increase in Hermes disposal costs.
RDA ATHENA and NIKE	2000M	2000M	2250M	2250M
O&S ATHENA and HERMES	250	250M	500M	500M
DISPOSAL HERMES	75M	75M	100M	100M
CLS NIKE	500M	500M	500M	500M
Fielding Schedule ATHENA	700	700	600	600

Event turn 3; Year 5 - 6

Variable	Roll 3 - 7	ROLL 8 - 10	Roll 11 -13	Roll 14 - 18
Scenario	Early in Year 5, US Forces deploy to a conflict in Europe with the NIKE where it performs superbly; the contractor support procedures in particular far exceed expectations. Congress begins serious debate to kill Athena and retain the NIKE as the permanent C4I vehicle, since it is performing well and saving funds. Fortunately for Athena, the prime contractor has a wide base of sub-contractors across the nation! The last of the venerable Hermes retire, and Athena fielding continues despite the Congressional rumblings.	Early in Year 5, US Forces deploy to a conflict in Europe with the NIKE where it performs well; the contractor support procedures in particular far exceed expectations. Some support in Congress to kill Athena and retain the NIKE as the permanent C4I vehicle, since it is performing well and saving funds. The last of the venerable Hermes retire, and Athena fielding continues despite the Congressional rumblings.	Early in Year 5, US Forces deploy to a conflict in South America. The limited numbers of Athena yet available initially preclude deploying them. Few roads and much rain and mud limit mobility with the NIKE wheeled vehicle. Soldiers compensate, but the problem reduces combat capability. Fortunately, the war is brief, but does delay Athena production as well as Hermes retirement.	Early in Year 5, US Forces deploy to a conflict in South America. Few roads and much rain and mud cause bad mobility in the NIKE wheeled vehicle, though CLS is judged to be effective. Limited numbers, training and support issues prevent sending Athena, so the Army quickly refurbishes the remaining Hermes, installs the modern electronics from the NIKE and sends these to combat. The brief conflict is almost over before the Hermes-hybrid vehicles arrive. The results of the war delays Athena production as well as Hermes retirement, and further deliveries of the NIKE are canceled.
RDA ATHENA and NIKE	2000M	2500M	2500M	2750M
O&S ATHENA and HERMES	250M	250M	500M	750M
DISPOSAL HERMES	0M	0M	25M	50M
CLS NIKE	250M	250M	500M	500M
Fielding Schedule ATHENA	900	800	800	700

Event turn 4; Year 7 - 8

Variable	Roll 3 - 7	ROLL 8 - 10	Roll 11 -13	Roll 14 - 18
Scenario	Users are very satisfied with continuously-improving C4I equipment aspect of the NIKE, which is being retired from the fleet at a rapid rate. Athena production and fielding are ahead of schedule.	Despite high user satisfaction with continuously-improving C4I equipment, the NIKE is being retired from the fleet at a rapid pace. Athena production and fielding are on schedule, though some obsolescence issues are already arising since the open systems approach was not used.	Users are satisfied with continuously-improving C4I equipment aspect of the NIKE, which is being retired from the fleet at a rapid rate. Production problems with Athena have slowed deliveries, and Athena O&S costs are higher than predicted. Some obsolescence issues are already arising since an open systems approach was not used.	Users are still satisfied with the C4I electronics equipment in the NIKE, though it is still being retired from the fleet. Production and performance problems continue to hound Athena and slow deliveries. Athena O&S costs are much higher than expected, as well. Some obsolescence issues are already arising since an open systems approach was not used with all subsystems. Congressional interest is rising, and a cancellation of the entire Athena program is likely.
RDA ATHENA and NIKE	1250M	1250M	1500M	1750M
O&S ATHENA and HERMES	250M	250M	500M	750M
DISPOSAL HERMES	0M	0M	0M	0M
CLS NIKE	0M	0M	250M	250M
Fielding Schedule ATHENA	400	400	300	300

NOTE TO FACILITATOR: If the group achieves FOC (2000 Athenas fielded) early, unused funds will be reprogrammed for other DoD priorities and the program submitted for the prestigious 'Golden Hammer' award.

Event turn 5; Year 9 - 10

Variable	Roll 3 - 7	ROLL 8 - 10	Roll 11 -13	Roll 14 - 18
Scenario	ATHENA fielding continues on schedule. Contractor teaming and good logistics support resulted in Athena O&S cost reductions from early projections. The contractor's decision to use open systems even allows some modernization through spares and avoided obsolescence, postponing the need for immediate upgrades.	ATHENA fielding continues on schedule and within budget. Projections for Athena O&S costs were accurate.	Athena fielding continues, but not without difficulty. Early versions failed at a much greater than projected rate and some assemblies from current production must be diverted to the field for repairs. Also, projections for Athena O&S costs were underestimated. Despite some Congressional interest in retaining it, retirement of the interim NIKE was finally completed.	Athena fielding continues, but not without difficulty. Early versions are failing at a much greater than projected rate and some assemblies from current production must be diverted to the field for repairs. Projections for Athena O&S costs were greatly underestimated. Retirement of the interim NIKE has been delayed to meet the shortfall in Athena; the NIKE is still performing well and staying within O&S cost projections.
RDA ATHENA and NIKE	0M	0N	250M	250M
O&S ATHENA and HERMES	250M	250M	500M	750M
DISPOSAL HERMES	0M	0M	0M	0M
CLS NIKE	0M	0M	0M	250M
Fielding Schedule ATHENA	100	100	100	100

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Acquisition

reform

week III

Hermes vs. athena:
alternative
3

Facilitator Guide
for
Total Ownership Cost Simulation

Phase IV
The Boardgame

Alternative THREE

I. Setting up the Boardgame.

For this phase, in addition to this guide, you will need the following:

Total Ownership Cost Simulation Game Board
Three Dice
Five Tokens for tracking budget scales
Two Pawns
Outcome Tables for Alternative THREE

1. Read to the team the following introduction:

Alternative THREE

> "You selected Alternative THREE. This approach will leverage contractor capability to provide a modernized C4I capability based on existing technologies and using Non-developmental and Commercial Items and processes. Interim support and disposal of HERMES systems will be provided through a contractor support package until the ARES is fielded with a full Contractor Logistics Support package. In the long term, the remaining requirements in the ATHENA ORD are projected to be met through a P3I upgrade."
>
> "This simulation will test your strategy against a combination of predetermined and random events. Remember, your goal is to provide a C4I capability which meets the user need for an affordable life cycle cost. Cost, performance and schedule will be concerns throughout the program life, and effectiveness will be evaluated in each area. Your goal will be to provide a fully modernized capability - 2000 ARES systems in the field - and establish a viable P3I program, without exceeding the ten year Total Ownership Cost target. Reducing TOC below the target will undoubtedly be rewarded, but exceeding the target or failing to procure the required number of systems could adversely impact your career."

2. Place the Gameboard on the table and arrange the game pieces as follows:

a) Place a marker on each budget scale as follows (top edge of the token should touch the value indicated):
   RDA $6.0B
   O&S $1.0B
   SLEP No marker
   Disposal No marker
   CLS $2.5B
b) Place one pawn on the "Start" space on the Event/Year track (hourglasses) on the left side of the board.
c) Place one pawn on the "Start" space on the Systems Procured track (coins) in the center of the board.
d) Give the Team Leader the dice.
e) Use the Gameboard Results template to record the result of each roll and final positions.

II. Playing the Boardgame

1. Events cover two years, so move the Event/Year pawn to Year 2, roll the dice and read the results of that roll from the Outcome Table for Alternative THREE, Event 1. Move markers on the budget scales to reflect the indicated expenditures and move the Systems Procured pawn the number of new systems procured. Record the results on the Gameboard Results template.

2. Move the Event/Year marker to Year 4, and repeat Step 1, using the Outcome Table for Alternative THREE, Event 2.

3. Continue as above for Year 6 (Event 3), Year 8 (Event 4) and Year 10 (Events 5), using the appropriate outcome tables.

4. Play is complete when outcomes have been determined for all five events. If 2000 new systems are procured before event 5, continue to play but retain RDA funds as excess instead of buying more systems.

5. If one of the budget lines is depleted before all events have been played out, funding may be "reprogrammed" by placing the marker for the depleted fund line on top of another marker. The "stacked" markers are then moved twice per event - once for each funding type. Reprogramming is only possible between RDA, O&S, and CLS. (Reprogramming is not required, and players may elect to continue deficit spending.)

6. Record the results of the game on the Gameboard Results template. Discuss the strategy choice and simulation outcome. Key points for discussion include why the alternative was selected and what risk factors were identified as part of the decision process.

Outcome Tables
for
Alternative THREE
(Leverage Contractor Capability)

Event turn 1; Year 1 - 2

Variable	Roll 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 - 18
Scenario	Hard work, research, and tough tradeoff negotiations yield an optimal set of prioritized requirements, and a sound business plan to achieve them. Hermes fleet management begins earlier than anticipated, allowing a reduction in planned O&S expenditures. The effort to build ARES based on NDI and CI integration is progressing well due to the extraordinary early planning. So far, all is progressing better than anyone had hoped—can this success streak last?	Hard work, research, and tough tradeoff negotiations yield an optimal set of prioritized requirements, and a sound business plan to achieve them. Hermes fleet management begins, as well as the effort to build ARES based on NDI and CI integration. So far, all is progressing according to schedule and cost projections. Let's hope things stay this way!	Work, research, and tradeoff negotiations take much longer than anticipated, but eventually produce prioritized requirements, and a sound business plan to achieve them. As a result of the delays, Hermes fleet management begins slightly later than anticipated, but the higher O&S costs resulting are not crippling. The effort to build ARES based on NDI and CI integration is proceeding well. So far, all is progressing fairly close to the schedule and cost projections.	Work, research, and tradeoff negotiations take much longer than anticipated, but eventually produce prioritized requirements, and a sound business plan to achieve them. Staffing and approval were also delayed when there was some question of legal issues involved. Unfortunately, as a result of these early delays, Hermes fleet management begins later than planned, but the higher O&S costs resulting are not crippling. The effort to build ARES based on NDI and CI integration is still proceeding well. So far, all is progressing fairly close to the schedule and cost projections.
RDA ARES and P3I/ATHENA	750M	500M	750M	750M
O&S HERMES	500m	750m	750m	1000m
CLS Hermes and ARES	250M	250M	250M	250M
Fielding Schedule ARES	100	100	100	100
Fielding Schedule P3I/ATHENA	0	0	0	0

Event turn 2; Year 3 - 4

Variable	Roll 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 - 18
Scenario	The transition to CLS for Hermes continues smoothly, and the anticipated cost savings appear to have been understated! Production and fielding of the first ARES has begun, and initial reaction from the troops in the field is very positive: the CI/NDI approach, along with use of open systems and performance specs has permitted fielding of a truly modern capability, even if it isn't quite 100% of what was dreamed of.	The transition to CLS for Hermes continues according to schedule, and the anticipated cost savings are now reality. Production and fielding of the first ARES has begun, and initial reaction from the troops in the field is positive: the combination CI/NDI approach, along with open systems has permitted fielding of a truly modern capability, even if it isn't quite 100% of what was dreamed of.	The transition to CLS for Hermes is a little rocky, but continues close to schedule, and most of the anticipated cost savings are now reality. Production and fielding of the first ARES began on schedule, and initial reaction from the troops in the field is generally positive: the CI/NDI approach, along with use of open systems has permitted fielding of a modern capability, even if it isn't quite 100% of what was dreamed of; and the P3I will cover the difference.	The transition to CLS for Hermes has been difficult: all the legal and bureaucratic requirements—A76 studies, Congressional interest—have acted but the program continues close to schedule, and most of the anticipated cost savings are now reality. Production and fielding of the first ARES began on schedule, and initial reaction from the troops in the field is generally positive: the CI/NDI approach, along with use of open systems has permitted fielding of a modern capability, even if it isn't quite 100% of what was dreamed of; and the P3I will cover the difference.
RDA ARES and P3I/ATHENA	2250M	2250M	2250M	2250M
O&S HERMES	250M	250M	250	500M
CLS Hermes and ARES	250M	250M	250M	250M
Fielding Schedule ARES	1000	900	900	800
Fielding Schedule P3I/ATHENA	0	0	0	0

Outcome Tables
for
Alternative THREE
(Leverage Contractor Capability)

Event turn 3; Year 5 - 6

Variable	Roll 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 - 18
Scenario	The cost savings from the Hermes CLS continue. User satisfaction with the contractor support is much better than anticipated—users and maintainers both appreciate the responsiveness and flexibility. The up-front planning and tradeoff work and the selection of a 'best value' source has permitted production and fielding of ARES to continue well ahead of schedule. Reaction to ARES from the field remains positive: it's more effective than the old Hermes, is easier to use and maintain—all at significant savings!	The cost savings from the Hermes CLS continue. User satisfaction with the contractor support is even better than it was under organic support—users and maintainers both appreciate the responsiveness and flexibility. The up-front work and the selection of a very capable contractor has permitted production and fielding of ARES to continue ahead of schedule. Reaction to ARES from the field remains positive: it's more effective than the old Hermes, is easier to use and maintain—all at significant savings!	The anticipated cost savings from the Hermes CLS continue as planned. Customer satisfaction with CLS is about the same as it was under organic support—sometimes there's just no pleasing troops! Production and fielding of ARES continues with only minor issues that are quickly resolved. Reaction to ARES from the field remains positive: it's more effective than the original Hermes, and is easier to use and maintain—all at a pretty significant savings!	So far, the anticipated cost savings from the Hermes CLS continue, but there's trouble on the horizon. The prime contractor appears to have seriously underpriced the support—so far there's no monetary impact to the government, but if the contractor 'goes under' we could lose more than just money. Customer satisfaction with the contractor support is no longer very high, either. In an effort to cut costs, the contractor implemented some changes that adversely affect support. The bright spot is that reaction to ARES from the field remains positive: it's still more effective than the old Hermes, and is easier to use and maintain.
RDA ARES and P3I/ATHENA	2250M	2000M	2250M	2250M
O&S HERMES	0M	0M	0M	250M
CLS Hermes and ARES	250M	500M	500M	500M
Fielding Schedule ARES	900	800	800	700
Fielding Schedule P3I/ATHENA	0	0	0	0

Event turn 4; Year 7 - 8

Variable	Roll 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 - 18
Scenario	US Forces deploy to a conflict in the Middle East with ARES where it performs superbly; the added effectiveness of the upgraded electronics and reliability of the automotive components made it a real workhorse. The CLS, too, exceeded all expectations—of course most of the support contractors were retired military anyway, and Gulf War vets, to boot!! The cost savings continue as planned, and the concept has proved itself in actual use!	US Forces deploy to a conflict in South America with ARES, where it performs superbly; the CLS in particular exceeds many expectations—of course most of the support contractors are retired military anyway and are no strangers to this kind of environment! The cost savings continue as planned, and the concept has proved itself in actual use!	US Forces deploy to a conflict in Europe with ARES, where it performs as expected; the CLS in particular exceeds many expectations—of course most of the support contractors are retired military anyway and are no strangers to this kind of environment!	US Forces deploy to a conflict in the Middle East with ARES where it performs superbly; the added effectiveness of the upgraded electronics and reliability of the automotive components made it a real workhorse. The CLS, too, exceeded expectations—of course most of the support contractors were retired military anyway, and Gulf War vets, to boot!! Unfortunately, though, the contractor's fiscal problems came to a head when one of its major sub-contractors unexpectedly went bankrupt after new pollution regulations increased the cost of disposing of Hermes. DoD was forced to pick up the additional cost of disposal and re-negotiate the CLS contract.
RDA ARES and P3I/ATHENA	500M	500M	500M	750M
O&S HERMES	0M	0M	0M	0M
CLS Hermes and ARES	500M	750M	750M	750M
Fielding Schedule ARES	200	300	200	100
Fielding Schedule P3I/ATHENA	100	100	100	0

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Event turn 5; Year 9 - 10

Outcome Tables
for
Alternative THREE
(Leverage Contractor Capability)

Variable	Roll 3 - 7	Roll 8 - 10	Roll 11 - 13	Roll 14 - 18
Scenario	The P3I ARES began fielding ahead of schedule, and it has been a big hit with the user. They are almost ecstatic over the improved capabilities. All this was made possible with good advanced planning, appropriately prioritized requirements, performance specs, open systems, maximizing vendor capabilities made possible by smart market research, and of course some luck.	The newest C4I system, the P3I ARES began fielding during this past two years, and it has been a big hit. The users, happy with ARES, are almost ecstatic over the P3I version. All this was possible through performance specs, open systems, and maximizing vendor capabilities.	The P3I ARES began fielding during this past two years, and it has been a big hit. The users, happy with ARES, are almost ecstatic over the P3I version. All this was possible through performance specs, open systems, and maximizing vendor capabilities.	A poorly-written amendment to the CLS contract caused numerous problems for soldiers in the field. As the contractor attempts to cut costs, service has become increasingly difficult to obtain under the contract and soldiers are improvising. Readiness suffers and O&S costs are beginning a climb to CLS levels. On the positive side, fielding of the P3I/ATHENA units began during the past two years and reports from the users have been very positive.
RDA ARES and P3I/ATHENA	0M	0M	0M	0M
O&S HERMES	0M	0M	0M	0M
CLS Hermes and ARES	500M	500M	750M	1000M
Fielding Schedule ARES	100	100	0	100
Fielding Schedule P3I/ATHENA	200	200	200	100

NOTE TO FACILITATOR: If the group achieves FOC (2000 Athenas fielded) early, unused funds will be reprogrammed for other DoD priorities and the program submitted for the prestigious 'Golden Hammer' award.